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CURRENT SUPPORT BRIEF

ELECTRIFICATION OF MOSCOW-IRKUTSK RAILROAD

OFFICE OF RESEARCH AND REPORTS

CENTRAL INTELLIGENCE AGENCY

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ELECTRIFICATION OF MOSCOW-IRKUTSK RAILROAD

Electrification of the double tracked rail line stretching 5,467 kilometers from Moscow to Slyudyanka, just beyond Irkutsk in East Siberia, has just been completed with electrification of the 271 kilometer section between the stations of Makashino and Isil'-Kul', west of Omsk. 1/ Electrification of this vital east-west artery has been a top-priority project because of its dense and rapidly growing traffic. Freight density on all or most sections of the Moscow-Irkutsk line had approached the maximum possible with steam traction and was growing rapidly enough to justify electrification in preference to diesel traction. At the present time freight density on the Moscow-Irkutsk line is said to be 4 times the average network density in the USSR 2/, or about 48 million net ton-kilometers per kilometer of route, and on the Omsk-Novosibirsk section, 8 times the average network density, 3/ heavier than anywhere else in the world. 4/

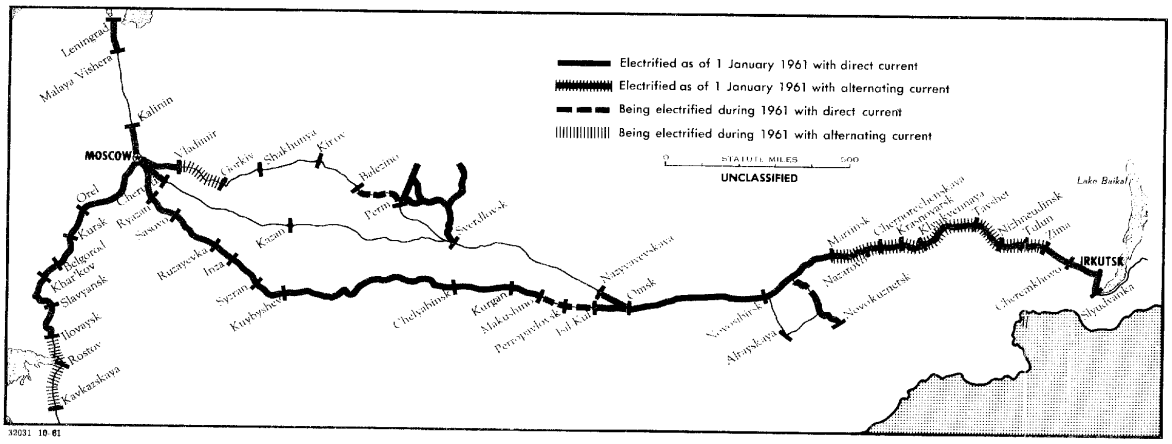
Electric traction requires expensive permanent installations to bring electricity to the locomotives through overhead wires (or a third rail), but at such high traffic densities low operating costs permit rapid recovery of the initial investment. In the US lesser traffic densities, lower costs, and greater availability of diesel fuel have contributed to the almost total use of diesel traction, with only a small amount of electrification. In the USSR, however, as well as in a number of other European and Asiatic countries (especially those without domestic petroleum deposits), electrification is at least as important as dieselization. Soviet authorities have calculated that, in their country, under average conditions, electrification is a better investment than dieselization when traffic density reaches 30 million ton-kilometer per kilometer of route on a double-track line or 15 million on a single-track line 5/. Electrification also has the advantage of increasing the capacity of a line somewhat more than dieselization, largely because of the greater average speeds possible with electric traction, and is probably essential to move a volume of traffic such as is now transported over the Omsk-Novosibirsk stretch. It is claimed that electrification together with auxiliary improvements has increased line capacity 70 percent on the Moscow-Irkutsk line. 6/

The current Soviet Seven-Year Plan (1959-65) provides for increasing the share of total rail freight traffic moved by electric and diesel traction in the USSR from 26 percent in 1958 to 85-87 percent in 1965, with an approximately equal role for each. At the end of 1960 electric traction moved 21.8 percent of total rail freight traffic, diesel 21.4 percent, and steam the remaining 56.8 percent. As of that date 13,800 kilometers of rail lines had been converted to electric traction and 17,700 to diesel, while the remaining 94,300 kilometers of the network were still using steam locomotives.

The stretch just electrified between Makushino and Isil'-Kul' was converted from steam to diesel traction in 1955 as an interim measure because traffic was becoming too heavy for the steam locomotives and electrification would not be practical until a new power plant could be built at Petropavlovsk. Complaints in the Soviet press in July suggest that because construction of this plant and the necessary transmission lines has been lagging, power may be available for only limited use of electric traction. 7/ The same article also complained of inadequate power for a previously electrified section of the Moscow-Irkutsk line between Klyukvennaya and

Nizhneudinsk in East Siberia, where only a few electric locomotives were then in use because of lagging construction of the Nazarovo thermal power plant and of the transmission line from Tulun to Tayshet.

The section between Makushino and Isil'-Kul' employs direct current in the catenary wire as do its adjoining sections, making unnecessary a change to a different type of electric locomotive, as would be required if the newer system of electrification with alternating current of industrial frequency had been used. The use of direct current also means that this section will not be seriously affected by the current shortage of electric locomotives in the USSR, since the deficiency is mainly one of alternating current locomotives. There are probably still not enough AC locomotives to permit elimination of supplementary diesel traction on the 1,222-km section between Mariinsk and Zima in East Siberia, where AC electrification was installed during 1959 and 1960, although the power shortage there is probably a more important restriction at this time.



The accompanying sketch shows the Moscow-Irkutsk line and major sections of the Soviet rail network which are planned for electrification during 1961. 8/ Alternating current is to be used on the Rostov-Kavkavskaya section of the line to the Caucasus and on the Vladimir-Gor'ky stretch of the Moscow-Gorky-Perm' line, but direct current is to be used on the Balazino-Perm' stretch of the latter line and on the remaining section of the branch line from Novosibirsk to Novokuznetsk in the Kuznetsk coal basin.

The only electrification work known to be underway on the Trans-Siberian Railroad beyond Lake Baykal is on a 40-kilometer stretch between Vladivostok and Nadezhdinskaya, where alternating current will be employed. Traffic on other sections of the Trans-Siberian apparently is not great enough to warrant electrification at this time. Diesel traction is being introduced on some stretches during 1961, however, 9/ and the branch line from Karymskaya to the Manchurian border at Zaybaykal'sk (formerly Otpor) is being completely converted to diesel traction. 10/

Analyst: [redacted]

Coord: [redacted] 25X1A

Sources:
1. Gudok, 11 Oct 61, p. 1, U.
2. Ibid.
3. Ibid.
4. Put' i putevoye khozyaystvo, No. 9, Sept 1961, p. 5, U.
5. Belov, I. V., et al. Ekonomika zheleznodorozhogo transporta, Moscow, 1960, p. 193, U.
6. Gudok, 11 Oct 61, p. 1, U.
7. Izvestiya, 28 July 61, p. 3. U.
8. Zheleznodorozhnyy transport, No. 9, Sept 1961, p. 9, U.
9. [redacted]
10. Ibid.

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